

Egg Capsule and Young of the Gastropod *Beringius (Neoberingius) frielei* (Dall) (Neptuneidae)

by

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Abstract. The egg capsule and capsule young of the gastropod *Beringius frielei* are described for the first time. Two egg capsules, one containing two young, were collected in the eastern Bering Sea. The young closely resembled adults of the species, and the capsules were similar to those of other eastern Bering Sea members of the genus *Beringius*.

Beringius (Neoberingius) frielei Dall, 1895, occurs in the eastern Bering Sea (Dall, 1895), off the east coast of Sakhalin Island and in the northern part of the Okhotsk Sea (HABE & ITO, 1972) and off Hokkaido Island (Pilsbry, 1907). The nominate race, *B. (Neoberingius) frielei frielei*, is found in the eastern Bering Sea from Unimak Pass to the Pribilof Islands at depths of 121 to 350 m (DALL, 1895; author's unpublished data).

Although *Beringius frielei* is common in the eastern Bering Sea, the egg capsule and young have not been described. On 11 July 1977, several specimens and two egg capsules of *B. frielei* were collected from a trawl haul made at a depth of 300 m north of Unimak Pass (55°24'N, 168°08'W). The adult snails (Figure 1) were cleaned and stored dry. The egg capsules, which were attached to an empty shell of *Fusitriton oregonensis* (Redfield, 1848), were preserved in alcohol. Although one capsule was empty and open along its distal perimeter, the other contained two well developed young that were easily recognized as *B. frielei* (Figure 2).

Each capsule was pouchlike with a single internal chamber. The two capsules were 18 and 21 mm high. Both were 27 mm wide and 7 mm thick. Their width decreased to 16 mm above the point of attachment. They were firmly cemented to the *Fusitriton oregonensis* shell by a flat expanded base measuring 18 × 25 mm. The common base shared by both capsules (Figure 3) indicates that they were laid by a single female.

As in other members of the genus, the capsule of *Beringius frielei* was a complete envelope within an envelope (COWAN, 1964; MACINTOSH, 1979) (Figure 4). Outer and inner layers were 0.15 and 0.10 mm thick, respectively. The outer surface of each capsule was pale yellow, smooth, and rubberlike, while the interior surface of the outer envelope was covered with numerous fine lamellae running approximately parallel to the capsule base. These lamellae were 0.1–0.2 mm high and numbered 4–6 per mm. The outer surface of the inner envelope was circumscribed with similar fine lamellae. The lining of the brood chamber was smooth and without macroscopic structural

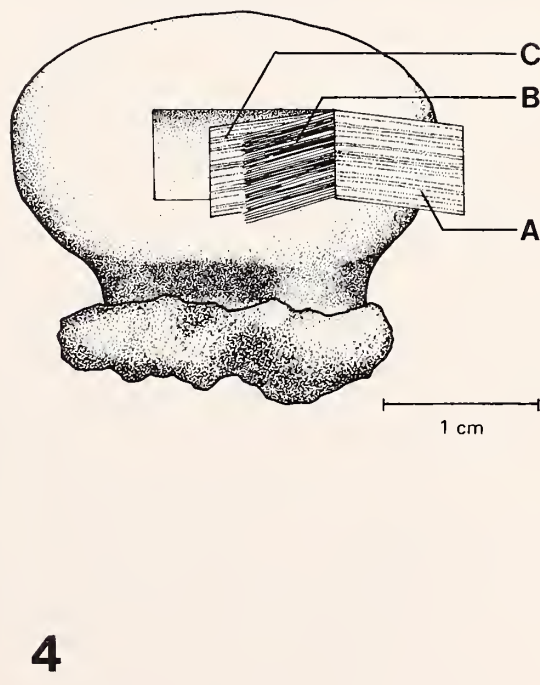
Explanation of Figures 1 to 4

Figure 1. Adult *Beringius frielei* taken at 300 m on the eastern Bering Sea shelf in same trawl haul with egg capsules.

Figure 2. Well developed young of *Beringius frielei* taken from an egg capsule.

Figure 3. Two egg capsules of *Beringius frielei* on empty shell of *Fusitriton oregonensis*.

Figure 4. Diagram showing capsule wall of *Beringius frielei* egg capsule. A, outer layer showing fine lamellae on inner surface; B, layer of slender yellow fibers; C, inner layer showing fine lamellae on outer surface.



detail. Between the two envelopes was a layer of slender 20–25 mm long yellow fibers parallel to the lamellae. They were mostly unattached and loosely packed, allowing easy separation of inner and outer layers. Some fibers were partially attached to the inner wall of the outer envelope.

The two capsule young were 16.2 and 15.0 mm in length (Figure 2). One shell was broken near the anterior canal while the other was whole. The shells were elongate, acute, and consisted of $4\frac{1}{4}$ well-rounded whorls with a deep suture. The three unsculptured nuclear whorls were pink, whereas the post-nuclear whorls were white. The first nuclear whorl was covered by a thin, parchmentlike film that made a shriveled apical cap. MacIntosh (1979) found similar caps on capsule young of *Beringius beringii* (Middendorff, 1849). The conspicuous sculpturing of the anterior quarter of the body whorl faded gradually towards the nuclear whorls. Spiral sculpture consisted of 34 evenly spaced, flattened close-set cords and an axial sculpture of fine but distinct incremental lines. Adults from the same area had this pattern in early whorls, but in the second to fourth post-nuclear whorls, the spiral cords became medially grooved or paired. The overall shape of the capsule young was similar to that of adults.

The egg capsules of *Beringius* (*Neoberingius*) *frielei* bear a striking resemblance to those of *B. (Neoberingius) turtoni* (Bean, 1834) from the North Sea and Skagerrak and *B. (Neoberingius) oassianus* from Norway (THORSON, 1940). Even the capsules of the more distantly related *B. eyerdami* Smith, 1959, and *B. beringii* are essentially identical in gross form and structure to those of *B. frielei* (COWAN,

1964; MACINTOSH, 1979), suggesting a greater degree of affinity among these species than might be presumed from studies of comparative shell morphology.

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